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The inclusion of the AGC and filter circuit 24 to extend the dynamic range of a receiver is undesirable for spectrally crowded applications such as cellular communications because it makes the receiver sensitivity dependent upon signals and interference that are outside the signal channel. For example, it is possible for a strong signal in an adjacent channel to capture the receiver front end and desensitize the receiver so that a weak signal in the channel of interest is undetectable. In order to avoid this type of operation, the AGC and filter circuit 24 must be capable of rejecting the out-of-band signals before they desensitize the receiver. The resultant filter included in the AGC and filter circuit 24 is typically a tunable narrowband, bandpass filter. Because it is currently not practical to realize such a filter on a semiconductor substrate, inclusion of such a filter significantly increases the cost and complexity of the receiver. Thus, although the AGC portion and LNA portions can be implemented on a high frequency semiconductor substrate, the design requires the signal path to exit the semiconductor for filtering. In order to exit the semiconductor, the signal levels must be increased thereby increasing the size, cost and power consumption of the receiver. In addition, the filter itself is typically implemented using discrete analog components, further increasing the size and cost of the receiver. Finally, the inclusion of automatic gain control creates a DC offset error which is a function of the automatic gain control setting, making offset correction difficult to implement.

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In one embodiment, inversion is performed by producing an inverted signal representation of the incoming waveform, producing a non-inverted signal representation of the incoming waveform, coupling the inverted signal representation to a first input port of a switch, coupling the non-inverted signal representation to a second input port of the switch, and coupling the conversion clock to a control port of the switch, wherein the incoming waveform is received over an antenna and wherein an amplitude of the incoming waveform is in fixed proportion to an amplitude of a signal strength received by the antenna.